Digitized by the Internet Archive
in 2018 with funding from
University of Toronto

https://archive.org/details/medjournalMay1934uoft

THE UNIVERSITY OF TORONTO MEDICAL JOURNAL

(An Undergraduate Publication)

This journal is published seven times a year, November to May, by the Medical Society of the University of Toronto, to serve as a medium for student expression and to bring to the student recent articles of scientific interest.

STAFF ADVISOR
Prof. E. A. Linell, M.B., Ch.B., M.D. Manc.

EDITOR-IN-CHIEF.
H. Colley Foster, M.A., '34.

ASSISTANT EDITOR
Paul B. Hamilton, B.A., '35.

ASSOCIATE EDITORS
Miss J. C. Gray, B.A., '34,
Omond M. Solandt, M.A., '36.

EDITORIAL REPRESENTATIVE
W. G. Bigelow, III B. and M.Sc.

BUSINESS MANAGER
Hugh J. Bright, '36.

YEAR REPRESENTATIVES

C. F. Wilcox, '34. D. D. Bonnycastle, '36. O. J. Clark, '38.
C. R. Baggs, '35. A. W. Sturgeon, '37. K. McAskile, '39.

Address all communications to Room 107, Anatomy Building.

Volume XI TORONTO, MAY, 1934 Number 7

EDITORIAL.

With this issue of the Journal the present Editors take their leave. In passing we wish to extend our sincere thanks to all our contributors for the wealth of material we have received. In particular we wish to express our gratitude to the members of the staff, whose response to our requests for articles has been most generous. We have been fortunate in receiving a greater number of voluntary contributions from the students than usual this year. The result is that we have had little or no space for reprinted articles in this volume and also that we have several excellent student articles which we hope to see printed in next year's Journal, along with a number of articles that are already in preparation by members of the staff.

We have received very few replies to our request for constructive criticism. One or two suggested that we get hold of some better material, but we notice that these critics have not as yet shown us any examples of what they think is better, so that we can not consider their criticisms as constructive. Personally we feel quite satisfied that the majority of the articles submitted to us this year were equally as good, if not better, than those published in recent years. Each volume in the past has contained more than one outstanding article that has been widely read and appreciated, especially by students studying for examinations. We hope that the present volume will prove no exception to this rule.

Next year the Journal will be in the capable hands of Paul Hamilton as Editor-in-Chief and Omond Solandt as Assistant Editor. Those students who wish to hold associated editorships are advised to consult Mr. Hamilton as soon as possible.

A FEW OF THE COMMONER FEEDING PROBLEMS IN INFANCY

By WM. A. HAWK, M.D.
Hospital for Sick Children, Toronto.

INTRODUCTION.

The title is self-explanatory; there are a certain number of such problems which occur fairly commonly in general practice. It is my intention to give as simple and as practical methods as possible, with the particular viewpoint of their easy adoption by the student and the general practitioner. Various schools have various theories; various texts have various methods; there are few subjects in medicine to-day upon which there is such a diversity of opinion as upon infant feeding. In choosing my background and the foundation for this article I am using the principles outlined by the Department of Paediatrics in their lectures and publications, in particular the lectures in Infant Feeding to the V year and the text "Common Procedures in the Practice of Paediatrics."

I shall begin by a brief review of the principles underlying the feeding methods. Through these principles I hope to give a satisfactory explanation of the choices of diet in the various problems. If possible, it is much better for the practitioner to understand the rationale of the various selections and the modification of these according to the child's condition, rather than to simply memorize certain feedings for certain conditions. It will enable him to individualize the treatment of his cases and to successfully cope with certain cases which do not definitely fall into the so-called "text book types."

The fundamental principles of infant feeding fall almost completely under the following seven headings:

1. Fluid Requirements.
2. Caloric Requirements.
3. Carbohydrate Requirements.
4. Fat Requirements.
5. Protein Requirements.
6. Inorganic Element Requirements.
7. Vitamin Requirements.

We shall give a brief description of these requirements. This description is not complete, but consists chiefly of a discussion under three headings.

(a) The requirements for an average infant.

(b) The variation in requirements from the average—for the normal and for the abnormal infant.

(c) Some facts about the various substances other than the requirements which are of value in feeding the abnormal case.

(1) **The fluid requirements** may be considered as 3 ounces per lb. body weight up to a daily total of 40 ounces. The volume of the calculated feedings should come to this amount and hence with the addition of plain boiled water between feedings, the total daily amount may be slightly in excess of the requirements.

I have calculated the total amount of the day's feeding. The amount at each feeding will depend upon the interval feeding, i.e., 7 times daily in the first two months and then 5 times daily until the end of the first year. A fairly satisfactory rule of thumb for gauging the amount to be given at each feeding may be obtained in ounces by the addition of 3 to the age of the child in months, the maximum amount being of course 8 ounces at a feeding.

In the calculation of fluid requirements for underweight infants two additional factors must be considered.

(a) The relatively large surface area and increased metabolism of these infants requires a greater amount of fluid than that obtained by simply multiplying the weight by 3. In such cases

a fairly accurate amount can be obtained by multiplying the expected weight of the infant by 3. For example:

Baby A (male), age 3 months, weight 8 lbs. The fluid requirements of this child would be greater than 24 ounces. Its expected weight would be 12 lbs. 8 ozs., hence its fluid requirement should be around 35-40 ounces. The amount at each feeding of such a child would probably be best obtained by using q 3 h x 7 interval feeding.

(b) In the feeding of these infants where a concentrated mixture is used, the total daily amount of fluid must be brought up to normal by the free administration of water between feedings.

In the calculation of the fluid requirements of the newly born and the premature infants one must remember that the optimum fluid intake may not be reached until the second week because of the small physiological capacity of the stomach.

For instance, the capacity of a newly-born full term infant is about one-third to one-half an ounce, reaching 2 ounces at the end of one week, and it only reaches three ounces from the tenth day onwards. The premature infant weighing, say three pounds, can only take ¼ ounce at birth and only reaches one to one and a half ounces at the end of two weeks. In such cases, in order to come as closely as possible to the fluid requirements, we must give as much fluid between feedings as we can, without producing either vomiting or anorexia.

(2) **The caloric requirements** need only be closely observed during the first year of life, because after that period of time the average mixed diet will cover it with ease. The figures arbitrarily used are: (a) 45 calories per lb. body weight up to 6 months of age. (b) 40 calaries per lb. body weight from 6 - 12 months of age.

One should remember that normal infants of average weight vary in their requirements. These figures are merely an average. Some will gain well on 30 calories per lb., others require as high as 60 calories per lb. to maintain a normal rate of growth.

Again, in the case of the underweight infant with the increased metabolism the caloric requirement will be higher, varying from 65 to 100 calories per lb. A good way to obtain the caloric requirement is to calculate the calories in a manner similar to the calculation of the fluid intake, i.e., from the expected weight and caloric values of that age period. For example:

Baby A (male), age 3 months, weight 8 lbs. The expected weight would be about 12 lbs. 8 ozs. The calories would be 45 times this or about 560 calaries. The number of calories per lb. required would be 70 calories.

This method will give an easy way to determine the probable caloric requirements. Above all, one must not forget that the caloric requirement of that infant is not definitely 560 calories—this figure is probably near it. The caloric requirement of that infant is the amount required to produce adequate gain. Altering the diet until this occurs is the only way of finding the definite caloric requirement. Our estimated caloric requirement is simply the figure to which the diet should be raised as soon as possible. When this level is reached, minor changes in the feeding will eventually produce the number of calories required for optimum growth and health.

The premature infant has a higher caloric requirement than the full term infant for several reasons.

(a) The rate of growth of the premature infant is more rapid than that of the full term infant.

(b) The absorption and utilization of the food is not as complete as in the full term infant.

Consequently we have higher caloric values — usually between 65 - 100 calories. The required amount can be found only by experimentation. Our aim is therefore to reach as soon as possible a caloric value somewhat between these figures. In these small

infants, however, a very important fact enters, namely, the capacity of the stomach is, as we have stated before, extremely small. The caloric values of our concentrated feedings are seldom over 25 calories per ounce, hence it will be between two and three weeks in such an infant before we reach the required caloric values. This fact will explain why premature infants seldom regain their birth weight before 3 weeks of age and why the rate of growth is so small at first.

(3) **The Carbohydrate requirements** of infancy can be given arbitrary values, namely:

(a) 1 ounce of carbohydrate, under 12 lbs.

(b) 1½ ounces of carbohydrate, over 12 lbs.

In actual practice these figures are the amounts of carbohydrate added to the milk dilution. Consequently the total carbohydrate is higher than the above values, because of the lactose in the milk. One must not forget as in all these calculations the tolerance of the individual infant varies. Same may not show signs of carbohydrate intolerance with as much as 3 ounces of added carbohydrate.

Another fact in regard to carbohydrate tolerance which apparently is not sufficiently appreciated is this, the individual has varying tolerance at different times. This may alter from week to week and is definitely lower in the summer months and is markedly lowered by any infection.

Another important factor in regard to carbohydrates is the variation in laxative effect of the individual substances. In actual practice only about six carbohydrates are used. In order of laxity they are: (1) Corn Syrup, (2) Lactose, (3) Cane Sugar, (4) Dextri Maltose, (5) Barley Flour, (6) Rice Flour. The proper selection of the carbohydrate is very essential in any difficult feeding problem, as is the early detection of carbohydrate intolerance.

(4) **The protein requirements** may be given average values, namely, the protein of 1½ ozs. of milk per pound body weight daily .

By the methods of calculating the feedings which are used here, the protein requirement is almost always automatically fulfilled. Hence in arranging a feeding one need not consider the protein particularly as it will be automatically obtained.

The proteins have two fairly important characteristics, namely:

(a) Protein is constipating and excess protein is of great value in treating diarrhoeas.

(b) Protein produces no harmful effects when given in large amounts. Quite a considerable part of the feeding may then be given as protein with no bad results.

(5) The **fat requirements** have, too, their average values, namely, the fat of 1½ ozs. of 4% milk or of 3 ozs. of 2% milk, per pound body weight daily.

In our calculation here the fat need not be definitely considered, as it too is usually automatically obtained. To obtain the fat requirements of the child, one need only see that the total fat of the feeding is about 2%, because a 2% fat feeding meets the requirements fairly accurately.

Unlike protein, fat in excess produces unfavourable symptoms—anorexia, vomiting, and the clinical picture of weight disturbance. This fact applies more particularly to the fats of cow's milk than to those of breast milk. In most of our feedings we try to keep the fat down to the actual requirements; consequently we use only about 2% fat feedings. Butter soup is the chief exception and in it the heating alters to some degree the fatty acid constituents, making it more easily digested.

(6) The **Inorganic elements** are essential to the life and development of the child. The essential elements number about ten. Of these, however, the usual milk diet supplies all except two —iron and iodine. The amount of iodine required during infancy is small enough to be neglected in our calculations. As far as iron is concerned, it

is necessary to add this element to the diet of our premature infant at an early stage, usually the end of the first month. This may be done by adding about 5 grains of iron and ammonium citrate to the total day's feeding of the bottle fed infant. In the breast fed child this may be met by giving about ¼ of the yolk of a hard boiled egg made into a thin paste with milk. These amounts will have to be increased as the child grows older. In regard to the full term child, iron should be added to the diet in some form at about nine months of age. This may be done by the use of Meads cereal, which contains a high iron content, by the use of egg yolk, or by the use of spinach as one of the vegetables in the diet.

(7) The **Vitamin requirements** are quite simply met in infancy by the addition of cod liver oil and orange juice. The average dosage is one teaspoonful of plain cod liver oil three times a day, one half teaspoonful of 10D cod liver oil three times a day, or by about 10 drops of viosterol daily. This should begin in smaller doses at about six weeks of age and should within a month reach the maintenance dosage. Orange juice in the amount of one ounce daily or tomato juice in the amount of two ounces daily are a sufficient supply of antirachitic factors. These should begin about the third month and reach the maintenance dosage in a month also.

The cod liver oil derivatives in susceptible children will produce anorexia, vomiting and diarrhoea. Antiscorbutic substances in certain children produce diarrhoea also. Hence in children with any gastro-intestinal disturbances neither of these should be given. If the child's condition shows either active rickets or tetany, viosterol in a dosage of 15 - 25 minims may be used. It is a point worth remembering that 10 D cod liver oil is about twice as powerful as plain cod liver oil—not ten times as powerful. Premature infants are very prone to develop rickets and should be given either quartz therapy or viosterol at the period at which they begin to show normal digestion and normal gain. The other types of children which are underweight do not need antirachitic substances as the production of rickets is proportionate to the rate of growth. Scurvy is relatively uncommon and antiscorbutics are not needed in the breast fed child.

THE PREMATURE INFANT.

In this article we shall only discuss the feeding of the premature infant. The mechanism and chemistry of digestion of these infants is not as highly developed as in the full term infant. In considering the digestion of any child there are five very important facts, the close observation of which will give a fairly complete knowledge of the process of digestion. They are:

(a) Appetite.
(b) Satisfaction (including colic or evidence of pain).
(c) Vomiting
(d) Stools.
(e) Weight gain.

In the premature infant there are usually some constant features which should be anticipated.

(a) **Appetite.**—They may often give the impression of having a poor appetite through a simple mechanical weakness in the act of feeding. This has to be watched for and different methods of feeding the child should be used, dependant upon the degree of weakness in nursing.

(b) **Satisfaction.**—Usually the infants appear satisfied and give little evidence of distress. A fairly important fact to be remembered is that over-feding in these infants does not often show colic as evidenced by expression of pain. Some of the commonest signs of over-feeding are vomiting and cyanosis after feeding.

(c) **Vomiting.** — Simple regurgitation very often occurs, but is not a very marked factor and need not be specially considered, providing reasonable care is taken to give amounts in the feeding corresponding to the size of the infant's stomach for that weight.

(d) **Stools.**—Premature infants are very prone to have frequent stools, very often loose in character. This is probably due to the high caloric and fairly high carbohydrate diets plus the wide variations in temperature of these infants. When planning a diet it is wise to have one fairly high in protein from the beginning.

(e) **Weight Gain.**—As stated before, at the first the gain is slow, returning to birth weight at about 3 weeks of age. Following this the gain is rapid, very often more than the average infant.

In the calculation of any feeding, as we have said before, there are seven requirements to be met. We shall discuss these briefly in regard to the premature infant.

(a) Fluid requirements. These have been discussed fairly fully in a previous chapter.

(b) Caloric requirements. These too have been previously discussed.

(c) Carbohydrate requirements. One should begin at a low level and reach about half an ounce added carbohydrate to the day's feeding. If there is insufficient gain and no signs of intolerance this may be gradually raised to 1 ounce added carbohydrate.

(d) Fat requirements. This need not be especially considered.

(e) Protein requirements. More protein should be added to the diet than the usual amounts because of the high metabolism and the tendency to loose stools.

(f) Inorganic elements. As previously stated, only iron need be considered.

(g) Vitamin requirements This has been discussed in detail in a previous section.

Following the above principles, let us construct a diet for an average premature. Certain practical methods will depend upon the child's weight. For instance a 2½ lb. child would require different methods of feeding and different amounts of food as compared to a 3½ lb. child. The basis of feeding for all these weights is, however, essentially the same.

We shall begin with:

I. **Type of feeding** to be used, or the materials from which to construct the diet.

(a) First and foremost without any close rival comes human breast milk. To obtain a supply of this is the most important factor in the feeding. This may be obtained from three sources, the mother herself, a wet nurse, or pooled breast milk from a hospital. This type of feeding is satisfactory for all weights of premature infants; the small ones will have to be fed by special procedures, the older ones may nurse directly. For those too small to nurse certain modifications of the breast milk may have to be used, namely, boiling, dilution or the addition of casec.

The question of boiling or not boiling the milk seems to be settled in favor of unboiled milk. However, if there is any doubt regarding the source of the milk, it is wiser to boil the milk. Because of the tendency to looseness, it is a wise precaution to add casec (calcium caseinate) to the breast milk in the proportion of about 1 tablespoonful of casec to each 3 ounces of breast milk in the total day's feeding.

During the first week of life in the smaller infants, it is often advisable to feed the breast milk diluted with water, beginning with about ½ strength and increasing to ¾ strength at the middle of the week

(b) Artificial feeding of these infants is always a risky experiment. There are numerous feedings advocated, but we shall only describe two which will probably suit the vast majority of these infants.

(i) The first substance is a butter soup mixture which may be used from the very first. This is a very concentrated feeding of high caloric value and small bulk. It is made from ordinary butter, Meads Dextri Maltose No. 1 and rice flour. The method of preparation is the same as that

of the standard butter soup. It is less liable to produce any gastrointestinal symptoms than the standard butter soup mixture; it is more constipating than the ordinary butter soup mixture; and it has a relatively higher percentage of protein than the standard mixture and can hence be fed for a much longer time. The caloric value of such a mixture is about 22 calories per ounce and its composition is roughly Fat 3.8, Carb. 7.6, Protein 1.5. It is fairly difficult to prepare and is a costly mixture, hence when the infant is gaining well and has reached between 4½ and 5 lbs. it should be changed to another type of feeding.

(ii) One of the best feedings for the larger premature and the ideal one to change to from the butter soup, is lactic acid milk. This is used as 2% lactic acid milk prepared from the culture with ½ to 1 ounce of added carbohydrate. At first it is best to use Dextri Maltose No. 1, but later if the stools are good quality a shift to corn syrup may be made. This feeding is not easy to prepare but is cheap and safe to use.

The use of these three substances should be sufficient to supply the needs of any premature. Any abnormal gastrointestinal symptoms which may arise can be treated similarly to those described under the dystrophies in a later section.

(c) Though not strictly a type of feeding, one should be careful to give these infants plenty of water between feedings. This should be given as a 5% solution of lactose or as a simple saccharinated solution of water.

II. **Interval of feedings** to be used.

The first feeding should begin about 4 hours after birth and the child should be fed every 4 hours for the rest of the first day. From then on it is fed every 3 hours, 8 times a day.

III. **Amount of feeding** to be used.

By this means we determine the fluid intake of the infant and also the total calories, because in the premature infant the calories are gradually obtained by increasing the amount of the feedings.

We begin with ¼ ounce, increasing about 1 drachm every 2 days until we reach 1 to 1½ ounces at a feeding. This amount of a feeding will usually suffice to supply adequate calories. For example in a 3 lb. child, 1½ ozs. q 3 h x 8 equals 12 ounces, 12 x 20 equals 240 calories or 80 calories a pound.

Once we have reached this level, as the child gains in weight we may increase it ¼ ounce at a feeding, watching for overfeeding evidenced by vomiting or an increasing number of stools. A practical rule may also be used, namely, in these infants the amount to begin with may almost always be ¼ ounce; the amount to which to raise the feeding during the first two weeks, which is really the maintenance level, is in ounces one half the birth weight, i.e., for a 2 lb. child it should be 1 ounce, for a 4 lb. child it should be 2 ounces. These amounts should supply enough calories to start the child gaining. The idea is to increase the amount fairly rapidly to this maintenance level, then increase it gradually as the child gains, watching for overfeeding.

IV. **Method of feeding** to be used.

This is very important for two chief reasons, firstly to ensure the fact that the infant receives sufficient calories and secondly to save the child's energy as much as possible.

In the case of the larger infants, 4 to 4½ lbs., nursing may be attempted. If the child nurses well it may be continued on the breast. However, it is a very wise idea to have the mother express her breast milk after nursing in order to maintain a constant supply.

If the child does not nurse well and does not obtain enough food, other methods must be used.

(a) The first to be tried is the Breck premature feeder which will allow the infant to take the milk from a nipple with more ease than an ordinary feeding bottle.

(b) The next to be used is an ordinary rubber pipette with a short tube

of rubber 1-1½ inches long which will allow the mik to be dropped in the back of the infant's throat.

(c) The next resort is gavage—a No. 18 French catheter is inserted by the nasal method about 12 cm. Through this the child is fed. This should be done in all very delicate prematures.

V. **Additional food elements to be used.**

These are simply iron and the vitamins. They have been described in a previous chapter.

THE ATROPHIC OR DYSTROPHIC INFANT.

This condition has received numerous names from various writers. The condition is essentially one of impaired nutrition or starvation. The causes of such conditions are diverse, but the end result is the same—namely, a malnourished infant. No matter what the precipitant cause of the condition may be, it produces its clinical picture by two methods. Firstly, interference with the indigestion of food, secondly, interference with the absorption and metabolism of the food, either directly or indirectly.

In the Hospital for Sick Children we classify the degree of malnutrition under the following headings: the mildest is the **substandard infant,** then the **dystrophy** and finally the **marasmus.** They are essentially the same condition but of different intensities. In considering our treatment it is fundamentally the same for all these conditions. Our aim is to change the marasmus into a dystrophy, this into the subnormal infant, and thence into the normal child.

Having chosen for our standard of treatment the most severe form of marasmus, we may find these conditions admitted into the hospital under the following classification:

I. **Marasmus without any abnormal gastrointestinal symptoms or dyspepsia.**

II. **Marasmus with abnormal gastrointestinal symptoms or dyspepsia.**

(a) Marasmus with vomiting.
(b) Marasmus with diarrhoea.
(c) Marasmus with intoxication.

Our aim in treatment is essentially first to change II (c) into II (a) or II (b). When this has been accomplished we attempt to change II (a) or (b) into I. This simply means that until we have corrected our abnormal gastro-intestinal condition we cannot make the child gain. That is our first consideration.

We have been discussing our treatment in rather general terms, and there are some very important general statements yet to be made: namely, in treating the abnormal symptoms of group II use fairly drastic measures from the beginning, but when treating the simple cases of group I go gently in your treatment. The effect of vomiting, diarrhoea, etc., upon these children is very severe. One should endeavour to stop it as soon as possible. Very often these infants will not respond to small changes and very intense methods should be used from the very beginning in order to save the child as much as possible. On the other hand, once the digestion is corrected the feeding should be increased or changed very slowly because the tolerance of these children is a very narrow zone and it can be very easily overstepped with disastrous results. The length of time for the repair period in these infants is fairly long. This should not be forgotten; too many make the mistake of rapidly increasing the diet because the child is not gaining, and thus overstepping the tolerance.

The last generality to be made in regard to treatment is simply this: attempt to prevent infection. The death of nearly all these marantic infants is due to a terminal bronchopneumonia. Nothing will lower the tolerance of an infant which is doing well as markedly as an acute infection. It will wreck weeks of careful feeding and cause either a set-back of some weeks or even death. If infection could be prevented the treatment of these infants would present a much simpler problem.

We shall begin our discussion of the treatment by dealing with the most severe form first.

A Marasmus with Intoxication.

In this picture the infant is stuporous, toxic, dehydrated with decreased tissue turgor and a history of severe diarrhoea or vomiting. The diagnostic feature of this condition is the toxicity. Once several have been seen the diagnosis presents no difficulties and may be made at a glance.

The clinical condition is due more to a simple loss of fluids and salts than to the absorption of any toxic products from the intestine. Consequently the treatment will consist chiefly of an attempt to return the composition of the body fluids to normal. This is done through the administration of fluids and salts

Treatment.—The various steps in the treatment of a fairly severe case would be as folows:

(i) Transfusion as soon as possible. 10-15 cc. of blood per lb. body weight is given from a donor of the same type as the infant. Gross agglutination need not be done. The vein selected is the internal saphenous at the ankle. The direct method with multiple syringe if possible is used. The transfusion may be repeated next day if necessary, but it should not be repeated within 48 hours if possible. Sometimes two or three transfusions are necessary, but very seldom more than this are given.

(ii) Continuous intravenous is started in the operating room at the same time that the transfusion is done. The solution used is a mixture of 2/3 5% glucose and 1/3 5% gucose in saline. It has been found that this is a better solution to use than one containing more saline—this stronger solution may throw these small, unstable infants into acidosis. The rate of flow is 5-10 drops per minute or about 15-30 cc. per hour. This should be kept up until all signs of toxicity and dehydration have vanished.

(iii) Even in these small infants it is a very wise move to give nothing by mouth, but a 15% sugar solution consisting of 6 tablespoonfuls of Dextri Maltose No. 1 and 3 tablespoonfuls of cane sugar added to 1 pint of water. This should be offered to the infant every hour and it shoud be allowed to take as much as it will This should be kept up until all signs of intoxication have vanished.

(iv) Medicine is of very little value in these conditions. With a severe diarrhoea, however the following mixture may be given, usually in doses of 1 teaspoonful every 4 hours.

Bismuth Carb. gs. ii.
Tinct. Camph. Co. Min. ii.
Mist cum Creta ad dr. i.

This mixture will usually turn the stools dark brown in color.

The above treatment should be carried on as long as the intoxication lasts. When this has been relieved it may be treated as a marasmus with either vomiting or diarrhoea.

B **Marasmus with Vomiting.**

This may be classified into two groups for which the treatment varies a little.

(a) One with a fairly recent severe history of vomiting.

(b) One with a history of chronic vomiting.

In class (a) the marasmus has occurred before the vomiting, the vomiting is the indication of a sudden break in tolerance, possibly infection or overfeeding. In class (b), however, the vomiting is chronic and may have been to a great degree the etiological cause of the marasmus.

Consequently in our treatment of these cases we wish to divide them into these groups. For in group (a) simply improving the health and tolerance is all the treatment needed. These cases will stop vomiting if this is done. In group (b), however, we have to search for some definite cause of vomiting and correct this factor before we can improve the general health and tolerance.

Therefore into our treatment of these cases there enters the differen-

tial diagnosis of vomiting. However, not all the causes of vomiting need be considered. The first division of the diagnosis is into: (a) causes of vomiting associated with weight loss. (b) causes of vomiting not associated with weight loss.

Obiviously no need may be taken of those in group (b). A further subdivision of group (a) may be given with the commoner types.

(i) Mechanical-pyloric stenosis, congenital abnormalities.
(ii) Toxic- infection anywhere in the body, enteral or parenteral.
(iii) Nervous - hypertonia various diseases of the C.S.F., hydrocephalus, etc.
(iv) Dietetic - underfeeding, improper mixture with too much fat, etc.

In order to make a diagnosis, the following steps should be undertaken.

(i) Complete history with special references to:
a. Feeding history.
b. Type of vomiting, projectile, etc.
c. Symptoms of infection.
d. Date of onset.

(ii) Examination of the infant for a source of infection. This includes urinalysis and auriscopy.

(iii) Examination of the abdomen, paying particular attention to gastric waves, abdominal tumours, etc.

(iv) Examination of nervous system, looking for hypertonia, evidence of organic disease.

When this has been carried out it will give a fairly good clue to all the common causes of vomiting. If the cause of vomiting has produced the marasmus, i.e., pyloric stenosis, it should be treated as soon as the infant is in good condition. That is not within the scope of this artice, however.

Treatment.—As we have already stated, the treatment of vomiting is essentially the treatment of the underlying cause. Once that is cured, the vomiting will clear up. Usually in these marantic infants, very little special treatment is directed towards the vomiting. We may consider the treatment at a later date with those associated with diarrhoea, however, a few special methods may be considered.

I. Feeding.—In the preparation of the feeding, a low fat diet should be used. In certain cases a thick cereal feeding may be used if the vomiting is very persistent, and no definite cause of the vomiting, such as infection, etc., can be found. In most cases the diets will follow that outlined in the treatment of these cases associated with diarrhoea.

II Parenteral fluids—also discussed under the diarrhoea

III. Special procedures.

(a) Gastric lavage may be done twice a day before two of the feedings. The solution is usually soda bicarbonate. The method used is the catheter and the intranasal introduction.

(b) Mustard plasters—one of mustard to seven of flour may be used on the abdomen every 4 hours as a counter-irritant.

(c) Medicines are usually of little avail; sometimes luminal gs. 1/10 to 1/6 are used before each feeding with beneficial results. Atropine is of value only in the definitely hypertonic infant.

C. **Marasmus with Diarrhoea.**

Diarrhoea is one of the commonest evidences of abnormal digestion. In the summer months it is probably the commonest ailment of infants.

In contradistinction to vomiting, the treatment of diarrhoea is mainly that of the diarrhoea itself, rather than that of the cause underlying it. In vomiting we pay more attention to the treatment of the cause and less to the treatment of the actual act of vomiting.

The causes of diarrhoea may be summarized under these headings:

(a) Metabolic - incomplete digestion of food, more particularly the carbohydrates, with the resultant fermentation.

(b) Infections - I. enteral infections of two main groups.

i dysentery, Miss-Russell, Shiga, giving blood, mucous and pus in the stools. The so-called infectious diarrhoea.

ii Bacilli of the Sonné group which are probably responsible for most of our acute intestinal intoxication of the summer months.

II Parenteral infection which is probably the commonest cause.

Hence the steps in the diagnosis of any cause of diarrhoea may be given as follows:

(a) History—particular reference to composition of the diet.

(b) Physical examination.--Search for foci of parenteral infection —urinalysis and auriscopy; also search for evidence of intoxication, dehydration, etc.

(c) Stool—i. Examination for blood, pus, mucus. ii. Culture for dycentery bacilli.

The preceding methods will give you the cause in most cases.

Treatment.—It may be given under the following headings, remembering, of course, that we are concerned here with the marantic type of infant.

I. Diet.

The first feeding with which to begin is one low in carbohydrate and fat and high in protein. Remembering that the infant's tolerance is low, it is our purpose to correct the diarrhoea, not to make him gain. Consequently begin on a diet low in calories and gradually increase it as the diarrhoea improves.

Our initial feeding will be protein milk ½ strength made from protein milk powder (5 level tablespoonfuls of powder to 22 ounces of cod boiled water). In severe cases of diarrhoea we may add casec to this feeding, 1-4 tablespoonfuls to the total feeding. The amount of this should be 3 ounces per pound expected weight, letting it take as much as it will. The feeding interval will best be every 4 hours for 6 times.

Within 2 or 3 days this should be increased to ¾ strength, sooner if fairly rapid improvement occurs. Within 2 or 3 days again it should be increased to full strength protein milk. This is the type of feeding the infant should be kept on until the diarrhoea has ceased. No carbohydrates should be added until the diarrhoea has ceased.

II. Transfusion.

In cases of moderately severe diarrhoea even without any signs of intoxication, it is a wise move to transfuse them. Usually one transfusion suffices —the technique has already been described.

III. Parenteral administration of fluids.

These should be given if there is:

(a) Insufficient intake of fluids by mouth through refusal of the child to take the bottle.

(b) Increased loss of fluids, either through vomiting or diarrhoea. It is much wiser to begin this type of administration before actual signs of dehydration (i.e. loss of tissue turgor) occurs. This should be anticipated by the careful study of the history.

There are four major methods of administering these fluids.

(a) Continuous intravenous
(b) Fontanelle puncture.
(c) Peritoneal injection.
(d) Subcutaneous injection.

Of these groups, (b) and (c) have practically been discarded here in favor of (a) and (d). For the acutely ill infant or one showing actual dehydration, the continuous intravenous is best. It gives the child complete rest; it is not handled as much and it provides a steady flow of fluid which can be increased or decreased as need be. The subcutaneous method should be used where the dehydration is very slight or in cases where dehydration is being anticipated. When a continuous intravenous is stopped, it should always be replaced by the subcutaneous method.

The fluid used is the same as in the intravenous, the amount at each injection is 10-15 cc. per pound body weight. The frequency is first three times a day, then twice a day, then once; finally, they are cancelled. The location may be anywhere, usually in the chest or abdomen.

IV. Medicines.

The only medicine used is the prescription of bis., carb., etc., given in a previous chapter.

V. Other Procedures.

Gastric feedings are sometimes given to those infants not acutely ill which refuse the greater portion of their feedings.

D. **Marasmus without any abnormal gastro-intestinal symptoms or dyspepsia.**

It has been our aim to convert each of the preceding types into this class. There are a number of cases, however, which fall directly into this class without any preceding gastro-intestinal upset. Again, as in most cases the treatment of these infants may be divided into groups which are to some degree dependent upon the etiology of the marasmus. They are:

(a) Marasmus with no organic defects.

(b) Marasmus with organic defects.

In the former class no cause can be found in physical examination to explain the state of malnutrition. Most of these are due to dietetic errors and the commonest of these is simply underfeeding in all of the constituents of the diet. In the latter group are those due to organic lesion such as a congenital heart, cerebral defects, cleft palate, unsuspected chronic infections such as pyuria, tuberculosis, syphilis, etc.

Treatment.—The first step is as usual an attempt to correct the underlying cause. The ones which show the best response are those due to chronic infections.

The rest of the treatment is a symptomatic treatment of malnutrition, the most important factor of which is diet.

I. Dietetic.

We shall begin essentially where we left off in the cases with diarrhoea. Full strength protein milk is in the majority of cases a very satisfactory feeding with which to begin. In the milder cases one can begin directly with a feeding which we use routinely after we change from protein milk.

(a) We begin with full strength protein milk in an amount calculated directly from the infant's actual weight. Then we gradually increase the amount until we reach the amount indicated by the expected weight, stopping if any signs of overfeeding, such as vomiting, colic, or an increase in the number of stools occur. Once we have reached this amount we gradually add a carbohydrate, 1 tablespoonful after another until one ounce has been added. The carbohydrates of choice are Dextri Maltose No. 1 or one of the starches. At this period the child should begin to show definite improvement in quality and finally begin to gain. It may be left on this feeding until it is gaining well. So far, we have made no direct calculation of our calories, but as you see, they follow fairly well:

For example—Baby A (male), age 3 mos., weight 8 lbs. Expected weight 12 lbs., 8 ozs.

Fluids—37½ or 7 ozs. q 4 h x 5.
Protein milk—35 ozs.—420 calories.
Dextri Maltose—1 oz.—120 calories.
Total—540 calories.
Calories from expected weight—562 col.
Calories per pound—67 cal.

Hence this system fairly well fulfills the required calories. In addition it begins on a fairly basal type of diet.

For example:
Actual weight—8 bs.
Fluids—25 ozs.
Protein milk—25 ozs.—300 calories.
Calories per lb.—40 cal.

It begins at a basal level, hence by following this system and neglecting the direct calculation of calories you automatically fulfill them.

(b) This diet will have to be

changed at a later date for one with a little more fat and carbohydrate. Another factor that causes a change is the expense of such a feeding. There are a number of diets fairly suitable which might be used. However, we will give only two.

1. For protein milk one can substitute 2% L.A.M. in equal proportions. This is somewhat difficult to prepare, but is, however, very stable, slightly constipating and easily digested. In addition it has a slightly higher caloric value. If the stools remain good, cane sugar and then corn syrup may be substituted for Dextri Maltose, these being more economical. This is probably the safest feeding and may be carried on for months. The next best would be:—

2. A feeding constructed with Dextri Maltose, water and either dried or evaporated milk, preferably the former, but if finances enter the question, the latter should be used. This should be given in amounts and calories equal to those taken from the previous diets, which caused the child to gain. This is fairly simple and economical. If there is any tendency to looseness of the bowels the Dextri Maltose should be replaced by rice flour. If the stools are constipated, a change to cane sugar or corn syrup might be made.

By the use of these three diets, the average marantic can be carried on until he is able to take the diet of a normal infant of that age. There are other diets but these are simple, safe and fairly successful.

II. Transfusion.

If the infant is not gaining well a transfusion may be used, somewhat in the nature of a tonic.

III. Parenteral Fluids.

This is very seldom needed, except when the infant refuses a great part of his food. Even then in those cases it is better to gavage the child.

IV. Medicines.—They are of no practical value.

Practically no other measures need be used. The treatment is simply dietetic, combined with common sense and some knowledge of the reasons underlying the various steps.

I should like to thank Dr. Alan Brown for his kindly suggestions and criticism of this paper.

BEAUTY

By MARION CATTO.

Dedicated to Dr. Stanley Campbell.

The beauty in a night of stars,
Fragrance of flowers drenched in rain,
The good salt smell of deep sea,
A sweet sonata's mellow strain,
The loveliness of love itself—
All these have stirred the hearts of men.
The beauty that is urging me
I found in gas and oxygen.

The labor-room with doctors robed,
And nurses, well-trained in their art;
The battle for a life begins,
Stark realism from the start.
The shattering waves of pain sweep down,
Recede, advance with towering crest,
O'erwhelm in agonizing pain
The body sore in labor pressed.

Beside her head a doctor sits.
He sits with heaven in his hand.
A tank, a tube, a rubber mask—
What ecstasy at his command!
A wave advances. Quick, breathe deep!
Breathe hungrily and deep, and then—
Go floating far where Beauty dwells,
In blessed gas and oxygen.

SURGERY IN THE TREATMENT OF PULMONARY TUBERCULOSIS

By ROBERT M. JANES, M.B., F.R.C.S. (C.).

In the present article it is proposed to do no more than give a brief outline for the student of the various surgical procedures at present employed in the treatment of pulmonary tuberculosis and to indicate so far as possible the different conditions under which each should be considered. Rest, fresh air and good food remain the most important factors in the treatment of any tuberculous lesion whether it be of joint, gland or lung. The former is much more difficult to obtain in pulmonary tuberculosis than in such a region as a joint and even with complete bed rest is relative only. For the majority of cases in which treatment is instituted reasonably early this partial rest along with the other measures employed to raise the general resistance of the patient, will be sufficient to effect a healing of the lesion. Other patients, however, require additional measures if they are to recover. Each patient should have been under observation sufficiently long to determine his reaction to the disease.

In instigating one or more of the various forms of collapse therapy one has in view first, the rendering of more complete rest and second, the collapse of pulmonary cavities. Pneumothorax and temporary or permanent paralysis of the diaphragm are the measures most often indicated if additional rest alone is aimed at; the more extensive procedures are chiefly concerned with the collapse of cavities.

It would appear that only in recent years has the poor prognosis of patients with open tuberculous cavities been realized. The patient with a persistent cavity or cavities would seem to have only a ten to twenty per cent. chance of surviving beyond the five-year period. During that time there frequently will have been exacerbations of the disease, he will have been a partial or complete invalid and, what is of equal importance, may have remained an inmate of a public institution and usually a public charge. If not confined to a sanitorium the patient will have continued to be a menace to his family and others with whom he has come in contact because of the continued or intermittent presence of tubercle bacilli in the sputum. So long as a patient has an open cavity it is impossible for him to be permanently rid of the disease. In the adequate collapse of that cavity two objectives are possible of attainment first, complete recovery with return to a gainful occupation and, second, the obtaining of a negative sputum so that the patient may leave the sanitarium and although still a partial invalid, may lead a happier life and no longer be a source of danger to those with whom he associates.

Pneumothorax.

While the institution of an artificial pneumothorax in most centres is carried out by the physician it is, properly speaking, one of the forms of surgical therapy. It is regarded usually as the safest of all forms of collapse therapy and in the absence of limiting pleural adhesions is the most effective. It has the great advantage of being controllable in its extent and may be used, therefore, in the presence of much more extensive disease on the better side and in certain cases may be employed to obtain a partial collopse of both lungs. Artificial pneumothorax is followed in a very considerable proportion of cases by a pleural effusion and in a small percentage by a tuberculous empyema. While the number of cases in which empyema occurs is small, it is sufficient to be worthy of consideration in the choice of a form of collapse and should be thought of more especially when only a partial

and ineffective pneumothorax has been obtained and it is necessary to use relatively high pressures. Pneumothorax is likely to be effective in the collapse of cavaties only when they are fairly early and thin-walled and therefore readily compressible and should be employed at this stage and before thick fibrous walls have developed. While there are exceptions, cavities of more than three cms. in diameter are unlikely to heal with bed rest alone. In the presence of a free pleura and thin-walled cavities a selective collapse is obtained frequently, the greatest collapse occurring in the region of the cavity and where it is most needed. It is useless to continue a pneumothorax rendered ineffective by plural adhesions unless the adhesions can be stretched or cut and closure of the cavity or cavities obtained.

Diaphragmatic Paralysis.

This is the safest of all forms of collapse therapy, but is unfortunately of limited value. A temporary paralysis is obtained by crushing the main phrenic nerve as it lies on the anterior scalene muscle or injecting it with alcohol. the small accessory branches being divided and a permanent paralysis by removal of a partion of the nerve or the avulsion of the distal portion after it has been sectioned. The operation is a simple one, easily performed under local anaesthesia and apart from rare complications which follow the avulsion is free from danger. Paralysis of the left diaphragm is followed not infrequently by digestive disturbances usually mild, but occasionally of sufficient severity to interfere seriously with the intake of food. A few cases of acute dilation of the stomach have been ascribed to the operation. The probable extent of the decrease in chest capacity is difficult to predict. Generally speaking it is likely to be greater in the presence of free movement of the diaphragm as observed under the fluoroscope. It is most effective in basal lesions, but decreases to a varying extent the movement of the lung as a whole and gives a degree of collapse to even apical cavities. It is of value as an addition to pneumothorax particularly in the presence of basal adhesions. It will often relieve an irritating cough associated with adhesions of the lower lobe to the diaphragm. It may be employed as a temporary measure in patients whose disease is too active or too extensive to permit of thoracoplasty and is done frequently following thoracoplasty to render the collapse more complete. It is sometimes sufficient in itself to effect the collapse of cavities of considerable extent. Except as a final measure following thoracoplasty the temporary paralysis is advisable usually in order that its efficiency may be discovered. When a thoracoplasty later becomes necessary for the collapse of apical cavities recovery of movement in the diaphragm may be of value in that it permits the patient to use the good lung at the base. Should marked disturbance of digestion have occurred a permanent paralysis is not to be desired.

Scalenotomy.

This operation consists in a division of the scalene muscles at or near their rib attachments. It is done under local anaesthesia, and although a much more extensive procedure than phrenicotomy, disturbs the patient very little. It is designed to do away with the movement of the upper three ribs and to give rest and a certain amount of collapse of the lung apex. Its results are difficult to estimate, especially since it is usually combined with a division of the phrenic nerve, but it does not seem to be sufficiently more effective than phrenicotomy to warrant the additional operative interference.

Pneumolysis.

In certain cases pneumothorax fails to close cavities because of bands of plural adhesions which passing from lung to chest wall hold the cavity open. Division of such adhesions will in suitable cases render the collapse effective. This division may be accomplished by the open method in which a portion of rib is resected and the adhesions divid-

ed with a cautery between ligatures or by the closed method in which a thoracoscope is introduced through a puncture wound in an intercostal space and the adhesion or adhesions are divided with a specially designed cautery. The procedure is carried out under local anaesthetic and causes little pain The dangers of the operation are haemorrhage, opening of lung with the production of a tuberculous empyema, and occasionally secondary infection either from the lung or chest wall. The adhesions must be string or band-like in type and must not be too extensive. Such adhesions are likely to draw out a long cone of lung frequently almost to the chest wall and usually contain a vessel of considerable size. Since the division must be done close to the thoracic wall injury of an intercostal vessel is always possible. This procedure has a limited application, but when indicated may save the patient from a much more extensive and deforming operation.

Tamponage.

This is of use in collapsing cavities. It consists in the separation of the lung from the chest wall through the layer of loose aveolar tissue, the so-called endothoracic fascia, which separates the parietal pleura from the chest wall. It can be done under local or general anaesthesia and is likely to be less disturbing than thoracoplasty. It may be indicated when it is desired to collapse cavities in an apex in the presence of an amount of disease on the other side which makes thoracoplasty inadvisable or to collapse an apical cavity when a partial thoracoplasty has been done already on the other side. Used extensively in Europe for some years the method is gaining in popularity on this continent. Many substances have been used to fill the hole left after the apex of the lung has been displaced downward. Some form of special paraffin mixture is at present regarded as most satisfactory. The dangers associated are tearing of the lung and consequent opening of tuberculous cavities, infections about the tampon either from the lung or from without and possible erosion of the wall of an abscess at a later date with rupture of paraffin into the pulmonary cavity.

Thoracoplasty.

For many years attempts were made to collapse tuberculous cavities by the resection of portions of the overlying ribs. They failed because they were insufficient in extent and because of failure to recognize that the maximum of collapse was obtained following resection of a given length of rib if the resection always included the posterior end of the rib. The local resection of portions of ribs overlying cavities gives only an inconsiderable collapse. This principle was first enunciated by Kilms and Sauerbruch and although the operation has been modified in many details the principles remain the same. At first done in one stage the operation carried a tremendous mortality. It is now never done in less than two stages, usually in three, and if the condition of the patient indicates it, as many more as necessary. The tendency at present is to design the operation to collapse particular areas of lung and to resect only sufficient ribs to obliterate the underlying cavity or cavities. Any operation which is not of sufficient extent to collapse the cavities in the underlying lung should be regarded as having failed. The collapse produced by thoracoplasty differs from that of pneumothorax chiefly in that it is irretrievable. For this reason even more than the fact that the operation is a major one it has been necessary, when complete thoracoplasty was contemplated to demand that the good lung be free of active disease. When a local thoracoplasty for the healing of apical cavities only is contemplated and when the lower portion of the lung will remain uncollopsed, it is now possible to admit cases with more extensive disease on the sound side and even in selected cases to do limited bi-lateral thoracoplasty. With the present technique the mortality from operation should not be greater than five per cent.

HEMORRHAGE DURING THE EARLY MONTHS OF PREGNANCY

By G. L. WATT, M.B.
Department of Obstetrics and Gynaecology, University of Toronto.

Hemorrhage occurring in the early months of pregnancy is a complication which causes a great deal of concern. Its appearance at any time after the onset of gestation should be a warning that the future of the foetus and mother are threatened. Every effort should be made to make an accurate diagnosis, institute adequate treatment and in this way avert a catastrophe to one or both. Bleeding at this time is usually significant of abortions, extra uterine pregnancies or hydatid moles, though it may be caused by attempts to bring on an abortion by chemical injury to the vagina or cervix.

Abortions. The commonest cause of bleeding in the early months is that of abortion and the commonest symptom of abortion is hemorrhage. It may or may not be preceded by pain, but practically all cases terminating in abortion at some time during the course have pain which is of a crampy intermittent character. Bleeding usually is slight at first, but increases in amount and in some cases is so severe as to endanger the life of the mother and require transfusion. When bleeding first occurs the abortion is only threatened, but undoubtedly some slight detachment has taken place and treatment is directed towards protecting from further detachment of the already unstable ovum. The patient is put absolutely to rest and sedatives are given in an attempt to make an irritable uterus quiescent. If the bleeding is accompanied by pain, morphine is the only satisfactory drug to use and should be given in sufficient quantity to keep the patient comfortable. This treatment must be instituted early if any result is to be obtained. Should the bleeding and pain subside, the patient must remain in bed for a week after all the signs have disappeared. Should the bleeding and pain increase in spite of treatment and the os dilate, the abortion becomes inevitable and treatment then resolves itself into controlling the hemorrhage and aiding the complete evacuation of the products of conception from the uterus.

In the absence of fever or the history of interference, severe bleeding may be controlled by packing. This is done preferably with iodoform gauze under aseptic conditions. The fornices are firmly packed by placing the gauze around the cervix until all are filled. The vagina is then packed tightly, using considerably more gauze than is usually done. If the packing is carefully carried out as described, hemorrhage can always be controlled. The methodical packing around the cervix with the use of large quantities of gauze is the important thing. It should be left in for 24 hours, during which time ergot and quinine (in doses of drams 1 of the fluid extract or grains 3 of pill Ergotin with grs. 3 of quinine every four hours) are administered. When the packing is removed the ovum is often found in the vagina. Should the physician feel this to be complete, ergot and quinine are continued for several days. In the first 24 hours there should be no actual bleeding and at the end of a week there should be no discharge, the cervix should be closed and the uterus well involuted. The patient may then be allowed up. If the bleeding persists for more than a few days and the patient runs a low grade fever under 100°, the abortion is probably incomplete and is a different problem. This is the conservative method of treating the abortion that becomes inevitable and is only applicable if the physician is able to follow

the case from the first. It is seldom that this is possible, as the doctor is usually called when the abortion is well under way and part of the ovum has been passed, placing it in the class of incomplete abortions.

Where this is the situation the temperature should be taken and a white blood count done. If the temperature is under 100° and the white blood count normal with no history of interference the uterus should be emptied as soon as possible by dilation and curettage, the larger portions of the ovum being removed by an ovum forcep and the cavity curetted thoroughly. The interior of the uterus is then wiped out with Churchill's iodine and packed with iodoform gauze. If the bleeding is profuse during the operation Pituitrin should be given to help the uterus regain its tone. The packing is left in 24 hours and the lochia will be pretty well stopped on the third day. In incomplete cases, the patient may be allowed up on the fourth day and home on the fifth. This is the most satisfactory way of treating all inevitable and incomplete abortions that are not septic because the uterus is known to be thoroughly empty and it shortens the patient's convalescence very markedly.

The incomplete septic abortion is the one that causes trouble. It is a very serious condition and should, in all cases, be treated conservatively. By this is meant Fowler's position, heat to the abdomen and ergot and quinine with general medical measures. There is only one indication for operation, and that is hemorrhage. If the patient is bleeding sufficiently, one's hand is forced and a curettage must be resorted to.

The septic abortion is so frequently due to interference that this may almost be taken for granted. Only a very small percentage of spontaneous abortions become septic. All cases running a fever above 100° for two consecutive readings should be treated as septic. A culture should be taken from the cervix and a blood culture done with the view of finding out the causative organism. If this is haemolytic streptococcus the outlook is much more grave. Infection by all other organisms with the exception of staphylococcii septicemia tend to recover. The preliminary report on the cultures may be obtained in 12 hours. If positive for streptococcus, scarlet fever antitoxin should be administered. The usual procedure is to give 30 c.c. into each buttock and 30 c.c. intravenously in about 250 c.c. of saline by the drip method. Serum should be given only after ascertaining that the patient is not subject to any of the allergic diseases and has had no previous treatment with horse serum. If such a history is obtained, sensitivity to serum should be tested and if positive, the patient should be desensitized before its administration.

As a rule this treatment is followed in about twenty minutes by a severe chill resulting in high fever and pulse rate, the fever often going as high as 105°. The usual treatment for a chill is carried out and the patients invariably recover from it. In 24 hours there is often a marked improvement and in more favourable cases the improvement continues, one treatment being sufficient. It may be repeated, however, up to a week following the first injection after which time it is dangerous due to anaphylaxis.

It must be remembered that the serum treatment is not a specific and some are doubtful of its usefulness. However, in Toronto it is believed to be of proven value and is used as a routine in cases where a positive culture is obtained from the servix. To be of any value it must be used early in the disease. When the temperature and pulse are normal the sedimentation time and white blood count approximate normal, it is safe to curette the uterus, removing the remaining decidua. This should be done with great care, using no more manipulation than is necessary The prognosis in a case of septic abortion is grave. The course of the disease, if not fatal, is often of long duration with the development of

cellulitis and intraperitoneal pelvic inflammation with its consequent impairment of function. In these prolonged cases it is necessary to observe closely the percentage of haemoglobin. Where is falls below 60, repeated small transfusions are of great value. Those cases that do not recover, die of septicemia or general peritonitis.

Ectopic Gestations. The next commonest cause of bleeding during the early months of pregnancy is ectopic gestation. This is a pregnancy occurring outside the uterus, the usual site of which is in the fallopian tube. It applies, however, to any pregnancy outside the uterus. Abdominal and even ovarian pregnancies are occasionally described. The aetiology of an ectopic gestation is not entirely clear, but it is believed to be a delay in the passage of the ovum down the tube leading to impregnation and embedding of the ovum in the wall of the tube before it reaches the cavity of the uterus. Consequently anything that will delay its passage may be a causative factor, such as previous inflammation or excessive length of the tube. When the ovum becomes embedded in the wall it grows and the decidual reaction takes place both in the tube and in the uterus. The ovum excavates the wall of the tube which increases in vascularity and presents a swelling at the site of the ovum. As this increases something must happen and the pregnancy terminates either in the formation of a tubal mole, rupture of the tube or tubal abortion.

The formation of a *tubal mole* takes place by the trophoblast penetrating the wall of the tube and forming blood sinuses. The sudden hemorrhage causes the death of the ovum which remains in the tube surrounded by blood clot. This is a constant source of irritation and causes repeated hemorrhage, the blood leaking from the end of the tube and forming a pelvic haematocele. This becomes walled off as the bleeding is comparatively slow. It usually occurs in the pouch of Douglas and displaces the uterus forward.

Tubal Rupture may be either intraligamentous or intraperitoneal, most commonly the latter, where the hemorrhage is often so severe as to endanger life. The ovum itself may be extruded from the tube and find attachment to the abdominal viscera or, as happens in the majority of cases, it perishes at time of rupture. If it does find a secondary attachment and the patient survives without operation, it may continue to grow and even come to term when it sets up a spurious labor, dies and if left without infection supervening, forms a lithopedian.

An intraligamentous rupture is one occurring between the two layers of the broad ligament and of course is extraperitoneal. Hemorrhage is not so profuse unless a secondary rupture through the broad ligament occurs. It may, however, extend extraperitoneally, above the brim of the pelvis.

When a *tubal abortion* occurs the ovum is extruded through the fimbriated end of the tube and usually dies, the whole ovum being found in the pouch of Douglas. The intraperitoneal hemorrhage commonly is not profuse, but in some cases may be severe. There is also the possibility that the ovum will remain alive and a secondary abdominal pregnancy may result.

Symptomatology. It is readily seen that ectopics are of two distinct types as far as symptoms are concerned. The early or unruptured and the late or ruptured variety, the latter being simply a further state of the former. The symptoms up to the time of rupture are the same.

The commonest symptom of ectopics is pain occurring in one or other lower quadrant. It is usually described as a dull ache with occasional very sharp knife-like pains shooting through it. These severe pains often cause the patient to feel faint and in some cases they do actually faint. Accompanying this, there is often pain in the rectum when the bowels move. There is little that is characteristic of ectopic pain unless it is association with faintness. Accompanying the pain there is a his-

tory of amenorrhoea in the majority of cases and a series recently reviewed in the General Hospital showed amenorrhea present in 51 out of 69 cases. Following the missed period there is a little irregular bleeding, usually dark in color and not great in amount. It is with regard to this history of irregular bleeding that a most careful history must be obtained. In a case of suspected ectopic, definite questions must be asked with regard to the menstrual history as to whether the period started on the expected date, lasted the usual length of time and was normal in amount. Many women consider all bleeding as menstrual and when asked if their periods are normal, will answer in the affirmative as long as there has been any show at all. Careful questioning will, however, elicit slight irregularities which give a clue to the diagnosis. The characteristic symptoms of ectopics are pain as described following a period of amenorrhoea accompanied by irregular bleeding, dark in color and not great in amount. A good working rule to keep in mind when differentiating ectopics from abortions is that abortions present a lot of bleeding and a little pain, whereas ectopics show a lot of pain and a little bleeding. There are, of course, exceptions to this, as to every other rule, but this is a good guide.

When the ectopic goes on to rupture the picture changes. Rupture may occur soon after the onset of symptoms or be delayed for some weeks depending largely upon the situation of the pregnancy in the tube. When it occurs there is severe pain and collapse. The symptoms are those of internal hemorrhage and will depend, of course, on the amount of bleeding. The pulse becomes rapid, the blood pressure falls and in many cases, shifting dullness may be elicited. The abdomen appears somewhat distended and feels doughy. There may be pain in one or other shoulder due to diaphragmatic irritation. One should not be led astray by the presenc of fever. Usually it is under 100, but it may go as high as 103. The picture is, however, very definite and where a history somewhat as described is obtained, the diagnosis presents no particular difficulty.

Diagnosis and Treatment. The diagnosis of the acute ruptured ectopic depends upon the history, signs and symptoms of internal hemorrhage and the bimanual examination which shows the presence of a mass in one of other fornix or the sense of fullness in the whole pelvis. If there is any doubt at all a posterior colpotomy can be done and old blood will be obtained from the pouch of Douglas. Differential diagnosis lies, of course, between that of ectopics and the other conditions which produce collapse with abdominal findings such as ruptured ulcer, Haemorrhagic pancreatitis, etc. As pointed out above, the pelvic findings with colpotomy will always clear up the diagnosis. The treatment, of course, is operative, but judgment must be exercised in the severe cases where the patient's condition is critical. Transfusion should be resorted to. When the diagnosis is made, the patient should be given morphine and an intravenous started. Blood should be obtained and administered as soon as the operation is started, the amount given depending upon the condition of the patient. Prognosis is good, but should be guarded in cases where the hemorrhage has been severe.

The diagnosis of the unruptured ectopic is much more difficult. It must be differentiated from other pelvic conditions causing pain and bleeding such as chronic pelvic inflammatory disease, ovarian cyst with twisted pedicle, incarcerated retroverted pregnant uterus and threatened or incomplete abortions. Diagnosis depends upon an accurate history which is the thing that leads to a suspicion of ectopics in the first place. The abdominal examination presents nothing characteristic. The pelvic examination reveals the uterus a little enlarged and softened with a tender rather cystic mass in one or other fornix, varying in size and extending into the posterior fornix. The mass, of

course, is one-sided and extremely tender This helps to rule out chronic inflammatory disease which is bilateral. The great majority of cases which are thought to be retroverted pregnant uteri aborting, are ectopics, and careful examination reveals the small uterus riding anteriorly on top of a pelvic haemotocele. This happens so often that one should carefully avoid this pitfall in diagnosis. In cases of abortion nothing outside the uterus will be found on examination. The laboratory findings are a great help, particularly the white blood count and sedimentation time. In ectopics there is a moderate leucocytosis, but the sedimentation time remains practically normal, whereas in inflammatory cases, it is always rapid. As can be readily seen, this is a good diagnostic point. The presence of a positive smear for G.C. should not lead one astray, as patients with G.C. can have ectopics the same as any other, if anything more frequently. In cases of doubt, posterior colpotomy can be done, and except in very early ones, blood will be obtained. Treatment of the unruptured ectopic is operative and should be undertaken as soon as the diagnosis is established for no estimate can be made of time of rupture. The prognosis is good and very much better before rupture has occurred.

Hydatidiform Mole. Hydatidiform mole is a rather rare condition, but as it causes hemorrhage during the early months of pregnancy it must be mentioned in brief. During the past ten years there have only been eight cases admitted to the Toronto General Hospital.

It is a degeneration of the chorion, the aetiology of which is not clearly understood. It can not be mistaken when seen as it appears very much like a bunch of grapes with vesicles varying in size from ⅛ inch to those the size of a bantam's egg. These vesicles sometimes break away and appear in the discharge, their characteristic appearance being described as that of white currants in red currant jelly. There is a proliferation of the syncytial layer and this is the dangerous part of the pathology as syncytioma or chorion epithelioma may result, this being a very fatal form of malignancy.

Symptoms. The patient always has a period of amenorrhoea of one to four months and may or may not have nausea and vomiting. There is usually some irregular bleeding during this time. On examination, the uterus is always found to be considerably larger than expected for the period of gestation. Most patients feel ill and complain of pain in the lower abdomen, with weakness. Secondary anaemia is often present where there is much bleeding.

The diagnosis is made on the rapid growth of the uterus, the irregular bleeding, the absence of foetal movements and the evidence of illness. Of course if a vesicle escapes the dignosis is established. The treatment is immediate emptying of the uterus and the method will depend upon its size. Sometimes a bag is introduced and the uterus allowed to empty itself. Most commonly a careful dilatation and curettage is done. The immediate danger is profuse hemorrhage and one should be prepared to deal with it at the time by transfusion if necessary, The remote danger is that of chorio-epithelioma. The patient then should be under observation for at least two years. Repeated A-Z tests during this time will be a great help as they are positive in high dilutions if chorio-epithelioma is present.

In conclusion the various types of bleeding in the early months have been covered with the exception of local causes such as polypi, chronic cervicitis and cancer of the cervix, all of which call for careful examination with the speculum at the onset of the bleeding. Cervicitis may be treated with silver nitrate Polypi removed and their base cauterized with the above. Cancer of the cervix calls for therapeutic abortion and treatment with radium as soon as possible.

SOME ASPECTS OF THE PROBLEM OF TUBERCULOSIS IN ONTARIO

A. HARDISTY SELLERS, M.D., D.P.H.

Although the infective nature of tuberculosis was recognized by Galen (A.D. 130-201) and even in the eighteenth century, isolation of tuberculous persons was enforced in Spain and Italy by sanitary edicts, medical opinion in the first half of the nineteenth century still regarded tuberculosis as constitutional or diathetic in origin. Indeed until 1897, in Ontario records, deaths from tuberculosis were classified under the group of constitutional or diathetic diseases. Sir Thomas Watson in his lectures on Principles and Practice of Physic (1836-37) said: "Is phthisis contagious? No. I verily believe it is not. A diathesis is not communicable from person to person. Neither can the disease be easily (if at all) generated in a sound constitution. Nor is it imparted, in my opinion, even by one scrofulous person to another. The disorder, I am satisfied, does not spread by contagion."

In 1882, the etiology of tuberculosis was established by Koch. Without this knowledge, anti-tuberculosis measures could hardly have attained the success which they undoubtedly have, in the prevention of this disease. The extensive campaign against tuberculosis has been part of the general "new vision" of the period following the discoveries of Pasteur and Koch. On the other hand it is a point for debate whether the steady decline in mortality from tuberculosis since 1900, in Ontario (and in Canada as a whole) may be attributed largely or even in major measure to anti-tuberculosis activities during this period.

In 1900, tuberculosis ranked in first place as a cause of death in Ontario, being responsible for 3,484 deaths, or 12 per cent. of deaths from all causes. In 1931, it ranked seventh in importance as a cause of death, causing less than half the number of deaths in 1900 (1,728) and contributing 4.8 per cent. of deaths from all causes. This reduction from a mortality rate of 160 to one of 49 per 100,000 population in three decades is marked indeed, but the problem of tuberculosis is by no means solved. In spite of the favourable picture presented by comparisons of past with present, tubreculosis is still a real problem. A large proportion of the deaths from tuberculosis occur during those periods of life which are most precious to the individual and when the economic value of individuals to the state is greatest. In addition, allowing at least five active cases for each death, the morbidity problem is readily conceived to be very great.

General Character of the Present Problem.

The percentage distribution by age of deaths attributed to tuberculosis in Ontario, 1931, is presented in Table 1.

TABLE I.

TUBERCULOSIS MORTALITY—ONTARIO, 1931.

Age.	No. Deaths.	Percent Total.	Percent of Deaths from all causes.	Rank as a Cause of Death.
5—14	79	4.6	8.5	Second*
Under 1	25	1.4	0.5	——
1— 4	65	3.7	6.1	Sixth
15—19	132	7.7	21.2	Second*
20—29	458	26.4	26.5	First
30—39	337	19.5	17.6	First
40—49	228	13.2	8.8	Fourth
50—59	178	10.3	4.6	Seventh
60 over	224	13.0	1.2	——
Total	1,726	100.0	4.8	Seventh

* Exceeded by "External Causes".

Over one-quarter of all tuberculosis deaths in 1931 occurred in the age-group 20—29 years, and one death in every four at this age was due to tuberculosis. Over one-half of the deaths occurred between the ages 15—40 and in this group, 20 per cent. of all deaths were ascribed to tuberculosis.

The relative importance of tuberculosis as a cause of death in various age-groups is also indicated in Table I. In the age-group from 20—39 it is the leading cause of death, and from 5—19 is second only to external causes. So, almost seventy-five per cent. of all tuberculosis deaths occur between the ages of 5 and 50 and (excluding deaths from external causes) tuberculosis is the chief cause of death in this broad group.

It is also a fact that almost twice as many deaths under 50 are due to tuberculosis as to either cancer or to heart disease. One does not question the importance of the latter two diseases, but a malady which strikes at youth and young adults must be regarded as of pre-eminent importance as an individual and social problem. There is ample foundation to-day for the statement that tuberculosis is Ontario's most pertinent public health problem.

Sex As a Factor in Mortality from Tuberculosis.

Until 1911, the mortality rate per 100,000 population from tuberculosis in Ontario was greater in females than in males. Since that time the crude rates have been generally similar. (In Canada, as a whole, the female rate still definitely exceeds the male. [1930, male 71.6, female 84.3].) When age and sex are considered together, wide variations between the sexes become evident. (Table II.) The figures are roughly similar to those of the preceding 5 years.

The sex differences thus begin to operate in early childhood and from 15—24 the female rate is almost twice the male rate. On the contrary, from

TABLE II.

TUBERCULOSIS MORTALITY—ONTARIO, 1931.

Specific Rates by Age and Sex.

Age.	Male.		Female.		Ratio of Female: Male Rate
	Deaths.	Rate.	Deaths.	Rate.	
Under 1	16	57.2	9	31.4	0.55
1— 4	33	26.2	32	26.2	1.00
5— 9	13	7.6	20	12.1	1.59
10—14	19	11.6	27	17.1	1.47
15—19	49	30.0	83	53.3	1.77
20—24	84	56.9	147	102.2	1.79
25—29	112	82.4	115	89.2	1.08
30—39	169	66.5	168	68.7	1.03
40—49	152	67.4	76	36.4	0.54
50—59	121	74.7	57	37.3	0.55
60 over	124	71.7	100	55.7	0.77
All Ages	892	51.1	834	49.1	0.96

40 onwards, the male rate is very much in excess of the rate in females.

The marked differences between the specific death rates in the two sexes provide food for thought. There are three fundamental considerations in this problem: (1) the human organism, (2) the infectious agent, (3) the environment. Do males differ from females in their biological reaction to the disease at certain ages to the extent that such difference is apparent in mortality? Or is environmental variation to blame for the differences?

The differences observed might be due to differences in exposure, to variations in susceptibility in the two sexes, or to chance. The discrepancies are too great to be accounted for on the basis of chance alone. We are by no means on certain ground in discussing sex variations in mortality, but the suggestion is that: (1) Sex differences during childhood and adolescence arise primarily from biologic differences in reaction to the disease, these in turn being related to the physiological changes occurring at these ages; and (2) During adult life it seems prob-

able that the predominant factor is the increasing difference in environmental risks to which adult men and women are exposed. It is, of course, possible that the high male rate over 40 may be, in part, due indirectly to the death of susceptible females in earlier years.

There are three pertinent facts associated with the hypothesis offered to explain the unfavourable mortality in young females (15—24); (1) The increased industrialization of young women. (2) Increasing extra academic activities of girls in high schools and colleges. (3) Physiological changes associated with adolescence. Tuberculosis is the classic example of the "soil and seed" relationship in disease, and these factors are all ones which tend to place increasing strain upon the organism. Therefore, to permit girls of high school age to engage in strenuous sport without complete physical examination is folly. Medical inspection is doubtless of great value in the public schools, but it is most certainly also essential in continuation and in high schools.

Tuberculosis Among Nurses.

The problem of tuberculosis among nurses is worthy of immediate consideration. The crux of the problem has been indicated by Myers and others. First of all, the misleading conception of universal tuberculosis infection must be (and is gradually being) abandoned. Heimbeck reports a series of 420 nurses tuberculin tested on admission to nursing school, 48 per cent. being positive. Subsequent tests (using the same technique, dose, etc.) revealed 100 per cent. positive tests. Thus some 218 young women had been infected during training. A report from Oslo states that 12 per cent. of nurses in general hospitals develop tuberculosis. Whitney reports an incidence one-third higher among nurses than in the general population. These young women must be safeguarded and the method is the enforcing of regular complete periodic physical examination, before during, and after admission to the nursing school. There is no reason to believe that the situation re tuberculosis among nurses in Ontario is any better than exists elsewhere.

Occupation, Economic Status, Environment.

The trend of the mortality rate from tuberculosis among males in the higher age-groups (Table I), one cannot doubt, is, in part at least, due to occupational factors. Certain industries which involve the aspiration of fine particles of silicate dust—gold and silver mining, grinding, sandblasting, etc.—are characterized by the incidence among the workers of the form of pulmonary fibrosis called silicosis. This condition tends to advance, and the end result is the development of active tuberculosis in the silicotic organs. It is interesting that these cases appear to be of low infectivity, the number of positive contacts from them being few compared with contacts of patients with simple pulmonary tuberculosis. In comparing specific occupational mortality rates from tuberculosis, it should not be forgotten, however, that certain occupations attract the unfit. This helps to account for the higher tuberculosis mortality in certain sedentary groups.

According to a recent report of the Registrar-General for England and Wales: "The mortality from tuberculosis (pulmonary) is largely governed by social circumstances. Those occupations with the highest specific mortalities are found to be among the lower economic groups. For example, although porters and dock labourers carry out their tasks mostly in the open air, yet the tuberculosis mortality in them is very high. On the other hand, slate miners, metal grinders, tin and copper miners have a far higher mortality from tuberculosis, although superior socially to dock labourers, etc. The effect of social condition is never as great, therefore, as that of occupational circumstances can be." Broadly

speaking, however, we may justly regard tuberculosis as primarily a socio-economic disease.

David A. Stewart, Medical Superintendent of the Sanitarium Board of Manitoba, in his own inimitable style, has said: "Tuberculosis is a challenge to our civilization because it is a by-product of the mistakes of our civilization; it is a challenge to economics, to preventive and curative medicine; it is a challenge to the life, health, happiness and the future of children."

Tuberculosis must be regarded as perhaps our greatest public health problem to-day.

Conclusion.

This brief communication is presented with the hope that it may serve to indicate a few highlights of the tuberculosis problem as it exists in Ontario to-day. Many details are wholly omitted, but certain pertinent data on age and sex variation have been presented. The importance of the problem of tuberculosis in industrial groups and among nurses has been touched on.

The student may gain much by preserving the broad picture of such a herd sickness as tuberculosis, while studying the individual case.

John Freind on Observation and Reading

Every physician will make, and ought to make, observations from his own experience; but he will be able to make a better judgment and juster observations by comparing what he reads and what he sees together. It is neither an affront to any man's understanding, nor a cramp to his genius, to say that both the one and the other may be usefully employed, and happily improved in searching and examining into the opinions and methods of those who lived before him, especially considering that no one is tied up from judging for himself, or obliged to give into the notions of any author, any further than he finds them agreeable to reason, and reducible to practice. No one, therefore, need fear that his natural sagacity, whatever it is, should be perplexed or misled by reading. For there is as large and fruitful a field for sagacity and good judgment to display themselves in by distinguishing between one author and another, and sometimes between the several parts and passages in the same author, as is to be found in the greatest extent and variety of Practice.

A man may practice . . . . all the days of his life, and yet never be the wiser for his experience if he neglects to make the proper observations which that experience might suggest to him; . . . . whereas the searcher of authors has the benefit of other men's experience, together with his own; and it is from the joint concurrence of these that we can hope for any considerable advancement in knowledge.

From "The History of Physick" . . . in a discourse written to Dr. Mead by J. Freind, M.P. Part I., London, 1725, pp. 303 et seq.

John Freind was born in 1675 in Northamptonshire, England, and died in 1728. For a time he served as an army surgeon on the Continent. In 1712 he became a Fellow of the Royal Society and in 1716 a Fellow of the Royal College of Physicians. In 1723 he was committed to the Tower of London on a charge of treason. While there he wrote the historical essays, from which the above is taken, addressing them to his friend, Dr. Richard Mead (1673-1754). It was through the good offices of Dr. Mead, physician to the Royal Family, that Dr. Freind was released from prison.

TORONTO AND THE CAMPAIGN AGAINST CANCER

By PERCY GHENT,

Department of Radiology.
Ontario Cancer Institute, Dunlap Building.

With the official opening of the Dunlap Building (formerly the Pathological Building of the University of Toronto) a notable place among the world centres in the campaign against cancer is assured for Toronto.

Of the four floors in this magnificently equipped institution, which houses the Department of Radiology of the Toronto General Hospital and the Ontario Cancer Institute, the ground and first floors are devoted to X-ray diagnosis, radium and X-ray therapy; and up-to-date departments of Urology and Clinical Photography On the second floor are fifty beds for the accommodation of patients undergoing treatment by X-ray or radium, and a similar number on the third floor for patients under the care of the Department of Urology.

But the main interest and prime importance of the new building centres about its formidable scientific equipment for fighting that dread scourge, cancer. Constantly in operation there are three high-voltage X-ray therapy units for the treatment of this disease, using 200,000 volts, which, with oil-cooling devices, energize costly X-ray tubes of the most recent models. Other machines are in use with more moderate voltages. Incidentally, it should be stated that the million or more volt machines for the treatment of malignant conditions, machines which have received considerable notice in the press, are still largely in the experimental and laboratory stage. For practical purposes and proven results, no more efficient therapy units than those now installed in the Dunlap Building have yet been devised.

With the opening of the Cancer Institute, the first broadside from a new and mighty weapon in the war against cancer, was fired in this stronghold of radiation. It is known popularly as a radium "bomb." Its more scientific and more dignified appellation is a "teleradium," or, in honor of the discoverers of radium, "telecurie" therapy apparatus. Originating with Dr. Sievert of Stockholm, Sweden, and thus far the only one of its type in North America; this bomb is a complicated, nickel-plated contrivance securely fastened to the ceiling of a special room. It has ingenious mechanical arrangements for directing the "fire" of the potent, invisible rays of radium in massive concentration at all angles. Massive indeed, for the bomb will be charged, or energized with no less than four grammes of the precious substance, representing a financial investment of about $250,000. Its function will be the destruction of malignant growths of deep-seated location. For lesions more superficial, the more familiar needles and radium applicators will still be used. Four and a half tons of lead, averaging a quarter of an inch in thickness, is overlaid on walls, ceiling and floor of the room where this apparatus is situated. This precaution makes the room "bomb-proof," not from within, but without, for the protection of other patients and the staff.

Thanks, then, to the courage of the Board of the General Hospital, the modern scientific skill and outlook of its professional staff, and the practical co-operation of the Ontario Provincial Government; the cancer sufferers of Toronto and the Province can face the future with a brighter hope. And it is

a hope, according to Dr. G. E. Richards, Director of the hospital's ultra-modern Department of Radiology, that is well-founded. In an address not long ago to the Association of Registered Nurses of Ontario, he said:

> "Those who are closest to the problem and are in a position to see both the successes and failures, feel that there is increasing ground for hopefulness. There is not the slightest doubt that our facilities for dealing with this terrible disease are more effective than they have ever been, and are steadily being improved. Certainly, more patients are being cured than ever before, and this is being accomplished with less mutilation and infinitely less suffering. The watchword of the medical and nursing professions should be, 'early, accurate diagnosis, and prompt, efficient treatment.'"

And the new Dunlap Building, the Cancer Institute, provides the last word of science both in accuracy of diagnosis and precision of treatment.

For the radiographic, or diagnostic side of the Institute's work, much new equipment has been acquired. Outstanding, is a highly efficient "Dynex" machine. With an extraordinarily wide selective range of current values, perhaps its most notable performance is in the radiography of the chest. Even with patients too sick to comply with the operator's familiar "Hold your breath!" radiographs of perfect quality, in which all movement of heart and lungs has been arrested, can be made in about one 75th of a second. And, of course, the apparatus is adaptable for a complete range of general radiography as well. Another machine, imported from England, is especially designed for the radiography of the skull particularly the labyrinthine ways of the accessory nasal sinuses. New angles, making it possible to secure unusual views of the skull, have added much valuable diagnostic knowledge in the pathology of the nasal sinuses.

There is an excellent department of clinical photography in the building, with modern equipment. Of unique interest here is a massive viewing box for the transparent photographs used to record the progress of the lesions treated toward cure. Its capacity is 1,500 transparencies on sliding metal racks, with correct illumination behind them.

Besides the film and case report library—containing the records of a substantial proportion of the more than a quarter-million patients examined or treated in the department's history—there is a growing library of the literature of radiology. Cheerfully decorated waiting-rooms, consultation and treatment rooms are a feature of the Dunlap Building, and their number and convenience make it possible to handle the average of about 200 patients a day, without undue delays. All in all, this modern clinic of radiology, just opened in its new quarters, is one of the most outstanding and completely equipped in the world.

The J. F. HARTZ CO., Limited

Carry a complete line of

MEDICAL STUDENTS' SUPPLIES

STETHOSCOPES, OTOLARYNGEAL SETS,
HAEMOCYTOMETERS, HAEMOGLOBINOMETERS.

34 GRENVILLE STREET TORONTO, CANADA

RINGWORM

By HAROLD G. PRITZKER, B.A., '34.

Among the host of diseases of the skin, Ringworm is one of the most interesting. It is one of the few diseases of humans in which Fungi play an etiological role. The appearance of the lesions varies greatly in different parts of the body and they respond differently to treatment. The disease, especially of the hands and feet, is daily becoming more and more prevalent, and even to-day some observers reckon that 50 to 90% of the population are infected.

RINGWORM OF THE SCALP.
(Tinea tonsurans)

The etiological agents here are two fungi—the large spored Trichophyton megalosporon and the small spored Trichophyton microsporon. It is not practical to discuss the sizes of these because they produce the same disease clinically, i.e., Ringworm. However, their arrangement is important for diagnosis. The fungus elements of the microsporon are arranged in a haphazzard manner to form a mosaic pattern. Those of the megalosporon form bead-like characters or rosaries. The microsporon usually grows outside the hair, while the megalosporon grows both inside and outside the hair.

Clinically, Rngworm of the scalp occurs chiefly in children between the ages of 5 to 12 years. One should bear in mind that the disease usually clears up at puberty even if no treatment is applied, and also that the disease is extremely rare in adults. It is a good rule that scaliness of the scalp in a child is ringworm until proven otherwise.

Early one notices a small, round spot on the scalp, partly denuded of hair. The hairs present are short, lusterless, bent and twisted because of the loss of elasticity. The skin surface is covered with gray-white scales and around the whole spot is a reddish ring on which the hairs are shorter than at the centre. Occasionally the infection is more widespread and patches of various sizes are scattered indiscriminately throughout the scalp.

The above is a description of the lesion due to the microsporon. That due to the megalosporon gives the appearance of bald spots on the head because the hairs are broken off very close to the scalp. The scaliness and redness may be much less here so that one must be careful not to make the diagnosis of Alopecia areata.

In making a diagnosis the examination of the hair microscopically is very valuable. To do this a short, broken hair is taken and placed in a drop of liq. potassae on a slide. On examination droplets of oil should not be confused with the mycelium.

Treatment.—The problem is rather difficult because of the length of the hair follicle. In order to destroy the last trace of the fungus it is necessary that the bottom of the hair follicle be reached by the application. However the spread of the disease may be checked somewhat by destroying fungi on the hairs and scales. Hence the child should have its hair clipped as short as possible. The head should be washed vigorously every day because this removes much of the fungus mechanically. Ringworm is quite contagious, consequently all brushes, towels, etc., used by the child should be kept separate from those belonging to others. Other children in the family should have their hair clipped short and heads washed every day too, since it is much easier to prevent ringworm than to cure it.

The methods of treatment to be outlined are typical of the modus operandi of many used in dermatology.

Direct Method of Treatment—i.e. the direct application of a drug to the

affected part for the purpose of destroying the fungus. Because of the fact that the fungi extend down to the base of the follicle, and that the follicle is filled with oily material, it is impossible for aqueous solutions to penetrate. Hence an ointment or soap or mixture of the two are used, massaging well into the affected spots at least ten minutes daily. The drugs used are usually mercury salts, copper salts, iodine, salicylic acid, boric acid, in some suitable base.

Indirect Methods.—These attempt to stimulate the skin so that it may naturally destroy and throw off the fungus. Thus iodine, mercury perchloride in alcohol, chrysarobin have all been used to stimulate the skin. The chief drawback of this method is the danger of irritants in producing a dermatitis. This, of course, would make matters worse.

Medicinal Method.—On the whole this is quite dangerous as it involves the use of orally administered thallium acetate. This drug acts by epilating the scalp. The treatment has the disadvantage that occasionally very toxic symptoms occur in a patient to whom it is administered. Further, it can only be used in children eleven years and older and in those over 30 Kg. in weight.

Mechanical Methods.—These attempt at epilation, because with removal of the hair much of the fungus is removed. On the face of it, this method seems impossible, because of the fragility of the hairs and the result of leaving the desired part in the follicle. However x-rays have proven to be a most helpful adjunct. A suitable dose of x-ray is applied to the scalp under the direction of an expert roentgenologist. In two to three weeks the hair begins to fall out and in four weeks baldness results. Frequent washings and scraping of the scalp should be performed during this time.

Some mild antiseptic ointment may also be used to attempt to destroy the fungus. Six to eight weeks after the x-ray, new hair appears and in three to four months the hair has completely re-grown.

This method is the method of choice and in the hands of an expert roentgenologist the risk of overdose is at a minimum. It should be kept in mind that x-rays do not kill the fungus but merely cause the infected tissue to become destroyed and loosened so that it may be removed from the body.

Many times the practitioner is called on to certify that a child is not infected with ringworm. After a very careful examination of the scalp, one should certify that there are no evidences of ringworm present—not that the child is free from ringworm. It often happens that the infected area is so small that it is missed.

RINGWORM OF THE BEARD.
(Tinea barbae)

On the face ringworm may appear in two forms. First as a circular scaly patch, rather flat in the centre and pink to red in colour. The scaliness is most marked at the periphery of the lesion. This is the simple ringworm as seen on the body, i.e. tinea circinata.

The common variety, however, is a deeper infection and is known as "Barber's Itch" (Sycosis Menti). The affected part is swollen, nodular and painful. The nodules should make one suspicious of ringworm. The disease may be contracted at a barber's or from some animal source.

Treatment.—The circinate type is comparatively easy. It usually disappears in a few days after applying one-half strength Ammoniated Mercury Ointment.

In Sycosis Menti, the hairs over the diseased part are allowed to grow long enough so that they may be seized with forceps and thus the affected part should be epilated thoroughly. Then weak Ammoniated Mercury Ointment should be rubbed in well. Since the hair follicles are now patent the ointment will be able to reach the fungi. As a rule these lesions respond readily to this treatment.

RINGWORM OF THE BODY.

The lesion on non-hairy skin is a red circular area, scaly, flat at the centre with raised edges. The typical "rings" are often formed by vesicles superimposed on these red patches. In the groin and axilla, where much heat is present, the lesions occur more commonly. Here the fungus grows very rapidly and the redness, scaling and vesiculation may be very great. Often the lesions begin around the perineum and spread up the abdomen and down the thighs. It is very common in hot countries and is known under various names (Dhobie Itch, Craw-Craw, etc.). The margins of the lesions are quite abrupt and the fungi may be found in them, on microscopic examination. A rather mild form of the disease often develops on the scrotum and the skin in contact with it. The skin is pink and slightly scaly—vesiculation is rare.

Treatment.—The direct method of approach is the one of choice here, because the fungus is quite superficial and hence it may be reached very easily. Weak Ammoniated Mercury Ointment (1%) is applied for a few days to help soothe the part and destroy some of the fungus. Then Whitfield's ointment may be applied if the lesion still persists.

Whitfield's Ointment—Ac. Salicyl. 3 parts; Ac. Benzoic 6 parts; Paraffin Mollis 25 parts; Oil Cocoanut ad. 100 parts.

RINGWORM OF THE PALMS AND SOLES.

(Epidermophytosis)

This is a very common infection, especially of the feet, when it is commonly known as Athlete's Foot.

On the hands, a slight scaliness and redness may appear between the fingers and on the palms. Occasionally an acute lesion appears with much irritation, redness and scaling. Very often these lesions are diagnosed as "eczema" and are allowed to go at that.

On the soles of the feet the infection produces an over-secretion of sweat, the skin between the toes is white and sodden and scales may be easily picked off. A characteristic odour is present. The toes are itchy and may be considerably inflamed. The fungus may be demonstrated by soaking the scales in liq. potass. for an hour or two and then examining under the microscope.

Treatment.—For the hands, Whitfield's ointment is very good therapy. It should be applied at least twice a day, and at night the patient should wear gloves. For weeks after apparent cure the patient should rub the hands thoroughly with half-strength Ammoniated Mercury Ointment at least twice a day.

In treating the feet one should attempt to keep the parts thoroughly dry by the use of a dusting powder applied freely at least twice a day. After any severe inflammation present has subsided Whitfield's ointment is also applied twice a day. The patient should wear cotton socks, should change them frequently and boil them every time they are changed. Shoes are treated with formalin and when the patient is apparently cured a new pair is used if possible. At night the shoes should be kept in a covered metal box containing formaldehyde. Patients should not use showers or bathtubs which are used by others until the lesions are cleared up.

Since the fungus is so wide-spread in showers, pools and locker-floors, one should go about these wearing wooden sandals. It has been suggested that hypochlorite foot baths be installed at all swimming pools, showers, etc., so that everyone's feet may be disinfected before using these.

RINGWORM OF THE NAILS.

(Onychomycosis)

This is the most obstinate form of the disease. If treatment is not applied the condition practically persists for life. Because the fungus is embedded in the keratin of the nail, treatment is difficult and prolonged. The nails become dull and yellow in colour and the

ends are rather jagged, thin and brittle.

Treatment.—This is usually unsuccessful and consists of scraping the nail down until it is too painful to go further. Then a strong antiseptic such as 10-15% salicylic acid in alcohol, is applied. As a rule these cases must be referred to a competent dermatologist.

TRICHOPHYTIDES.

As brief and meagre a description of ringworm as this paper is, it would not be complete without mentioning trichophytides. This is a general manifestation of some trichophytic infection in some part of the body. It is supposed to be due to some allergic phenomenon, the patient becoming sensitive to his own serum, which contains some "exotoxin" from the fungus. The patient usually suffers some malaise, rise in temperature, and a rash may develop. This may be papular, vesicular, scarlatinaform or erythematous. It usually occurs in the trunk, but may also occur on the limbs and face.

Treatment.—The general manifestations disappear when the local area of ringworm is successfully treated. Symptomatic treatment is indicated. If the rash is irritable, soothing ointments may be applied.

CONCLUSION.

It is hoped that this paper has given a sufficiently extensive outline of this disease, which will enable one to recognize and treat these conditions properly. If it will prevent many cases of ringworm from being diagnosed "eczema" it has more than served its purpose.

CORAMINE "CIBA"

THE SAFE AND DEPENDABLE CIRCULATORY AND RESPIRATORY STIMULANT

Clinical results—the ultimate criterion—definitely establish the outstanding value of CORAMINE "CIBA" for use not only in temporary emergencies, but also where a relatively prolonged action is desired.

You will find it of great service in such conditions as pneumonia, influenza, senile debility, myocardial involvements, accidents from anaesthesia and poisoning by various drugs or gases.

Liquid. **Ampoules.**

CIBA COMPANY LIMITED, MONTREAL

STATE MEDICINE IN WESTERN CANADA

By W. G. BIGLOW, '38.

To-day, when our attention is brought almost daily to the subject of "state medicine," it is interesting to see just to what extent it has been developed in our own country. The term "state medicine" is used very loosely and involves such a variety of types of organization that it carries very little significance in itself. We understand it to mean an organized medical service with no regard to the type of political body that may be controlling it.

The administration of medical services has various aspects depending on the conditions of the people to whom it is administered. Industrial districts for example, have methods of providing medical care that could not possibly be applied to a group of people of a less homogeneous nature. England's Panel System, Russia's "Public Health System," and the recent advent of Commercial and State Health Insurance are all phases of what we so broadly call State Medicine. This article is not a discussion from any particular point of view—it is merely an outline of the development that has taken place in Western Canada — Saskatchewan in particular—along one special line of organized medical service.

Causes.

There are many different reasons why this new system has been adopted by these scattered communities in the West. In general the causes have been one or more of the following:

(1) The withdrawal of all practitioners from the community because of difficulties in earning sufficient income.

(2) The death of a local practitioner with no physician willing to take over his practice in the community.

(3) Complaints of excessive costs to individual families, particularly to those most remote from the physician's residence.

(4) Allegations that medical service was insufficient or inferior in quality, because the local practitioner lacked interest or time. Not uncommonly the local physician has placed before the municipality the alternative of employing him on an annual salary or having him move to another community. Thus you can readily see that the depressed financial condition that is so evident in the prairies has proved a strong factor in promoting "state medicine."

Political Aspect.

In Saskatchewan and Manitoba it is the rural municipality that has been forced to accept the responsibility for the medical care of its population. As is probably known, November 1933, found a representation of medical men from all Canada approaching Premier Bennett on the subject of Dominion State Medicine. Unfortunately they received no co-operation from the federal government. Previous to this the Federal government had promised to pay one-third of 50% of the medical relief work if the provincial and municipal governments each paid a third. They later withdrew, however, and announced that they would not participate. Following this, the Ontario Government struck an agreement with the municipality to pay 2/3 of this sum as a relief measure under certain conditions. The governments of Manitoba and Saskatchewan, however, made no such move, leaving the responsibility entirely to the municipality.

The rural municipalities in Saskatchewan and Manitoba are purely a political subdivision, separate from the towns and villages that may be located within their borders. In the "organized territory" of Saskatchewan, for

example, there are 301 rural municipalities with approximately 15% of the population in 8 cities, 16% in 457 towns and villages, with the remainder, 69%, living on farms. In 1931 twenty rural municipalities had adopted the "Municipal Doctor System" (let us call it) in Saskatchewan, with three in Manitoba. In addition to this twelve other municipalities were granting $1,500.00 or less to the physicians practising there for public health service and the care of indigent persons.

Of course the individual terms of agreement under which the municipal doctors are engaged vary, though in general the system is the same. It is optional whether the villages and towns within the boundaries of the municipality participate in the payment of the physician. When such is not the case, the village or town is either attended on a private practice basis by the "municipal doctor" or by a practitioner in the village.

There are features of the Public Health and Hospital Service in Saskatchewan that definitely aid the development of a municipal Doctor System. The Province gives free institutional and medical care for cases of tuberculosis. They also allow a grant of 50c. per patient per day for all medical care rendered by hospitals of a certain standard, whether they are government, non-profit institutions, or proprietary. The funds are raised by general taxation.

Services.

As to the services of the "Municipal Doctor"—he renders free medical care to all taxpayers in his district. He may have a private practice as well, provided it does not interfere with his other work. His work is that of a general practitioner usually excluding all major and a great deal of the minor surgery. Office calls are free, whereas in some communities nominal "special fees" are charged, such as $2.00 for the first home visit; $5.00 for reduction of a fracture; $7.00 for obstetric service. He does not supply drugs.

He serves as medical health officer for the community and, besides the usual duties performed in this capacity, in some cases provides periodic health examination of school children.

Financial Aspect.

In considering the financial aspect of this system, we shall first look at it from the point of view of the doctors involved. The average salary of twenty of these men on the full time basis is $4,000.00. This is a very comfortable sum compared to that made by many general practitioners in the West. In nearly all cases they are able to earn other income from the "special fees." For example, one man collected an extra $1,590.00 which, less his medical expenses of $732.00, left him a net income of $4,858.00.

The municipality and residents are not without additional expense over and above the physician's salary. Besides the "special fees," they must pay for services rendered them by the physician not covered in his annual contract as well as fees for the services of outside hospitals and nurses that may be required. The resident also pays for his drugs and must contribute through taxation to the upkeep of the hospitals and T. B. sanitaria already mentioned.

A particular aspect of the situation becomes evident here. A survey was made of the total cost of medical care to the residents of one particular community. They found that fees paid to specialists and outside hospitals, by a very small minority representing 4% to 6% of the total families, amounted to approximately 1/3 of the total cost. Thus you can see that although the municipal contract scheme operates to reduce the unevenness of distribution of the financial burden, it does not of itself completely eliminate it.

The tax levied for the doctor's salary is on a property basis and on an average amounts from $7.50 to $10.00 per family per annum. It has been estimated that the same services paid for at the conventional rates would

generally involve a greater expense than this. There is a reduction in cost to be considered, resulting from the prevention of communicable diseases by the early care of acute cases.

Opinions Regarding the System.

An organization called the "Committee on the Costs of Medical Care" of Washington, D.C., whose figures I have made use of in this article, attempted to obtain the opinions of those involved in the municipal Doctor System—with regard to its effectiveness. In general, the physicians appeared to consider that their incomes were larger under this system than they would be in private practice. They denied that the personal relationship necessary to effective medical practice was lost, and were pleased at the readiness that the people availed themselves of the physician's services, especially in prenatal care of maternity cases. Opposition was raised by non-resident land-owners and well-to-do farmers, especially those with small families.

Some minor changes were suggested, such as the provision of office space and instruments for doctors and the employment of a trained nurse by the community. Some expressed the desirability of graduate study for the municipal doctor at the expense of the community. As further extension of the system, three municipalities are considering pooling their tax fund to maintain a surgeon to do surgery for the three municipalities.

Summary.

In summing up the various aspects and general implications of this relatively new system of state medicine, just outlined, we must bear in mind the fact that it has been applied to rural communities. Here the population is usually disposed in small villages and widely scattered farms involving a great area. Thus, under these conditions, the organization is limited.

Certainly the "municipal Doctor System" has provided physicians to communities that might otherwise have been without them. Some of these districts are so "hard hit" financially that a private practitioner would not have a possible chance of making a living. This organization, however, can effect definite economy in providing services. In some of these communities it is not true that the system is regarded favourably by the residents, but it has been a necessary measure. When one states that no municipality that has adopted this system has returned to the private practice basis perhaps, at least in some cases it is because they have no alternative. The arrangement by which municipal physicians may practise medicine on a fee basis among residents not eligible to free service has certain evident disadvantages and may lead to the neglect of his real patients.

Abuse of the privileges given the patient, through excessive demands on the doctor's time, have been discouraged by public opinion. There is a tendency to refer cases which might prove troublesome and involve a great deal of time and effort, to larger centres to be treated by specialists at the patient's own expense This probably comes as a result of lack of competition which is the manstay of good work among competitive doctors in a community.

The free choice of a physician is not possible under the conditions as they are in the West. The small number of residents in a large district only warrants the services of one doctor and makes the next closest man almost inaccessible for ordinary service.

One of the most direct benefits of the system is the improved public health and preventive treatment. The sometimes unfavourable self-medication is decreased.

Speaking generally, the extremely depressed financial state of the farmers in the West has led to severe trials of the country doctor. Things are in such a state now that many communities have private practitioners who are only staying on from the goodness of their hearts with no remuneration—real philanthropists.

The state medicine that has been

organized is a wonderful experiment to relieve the situation and is a possible improvement in the general administration of medical care all over the country. While not suggestive of a more complete organization these facts are brought out for the reader to make his own conclusions with regard to the effectiveness of the system as it now exists.

PABLUM—MEAD'S PRE-COOKED CEREAL.

Mead Johnson & Co. are now marketing Mead's Cereal in dried, precooked form, ready to serve, under the name of Pablum. This product combines all of the outstanding mineral and vitamin advantages of Mead's Cereal with great ease of preparation.

All the mother has to do to prepare Pablum is to measure the prescribed amount directly into the baby's cereal bowl and add previously-boiled milk, water, or milk and water, stirring with a fork. It may be served hot or cold and for older children and adults, cream, salt and sugar may be added as desired.

Mothers will co-operate with physicians better in the feeding of their babies because Pablum is so easy to prepare. It gives them the extra hour's rest in the morning and saves bending their backs over a hot kitchen stove in summer. Please send for samples to Mead Johnson & Company, Evansville, Indiana.

INDEX

Page

Acute External Otitis—J. Sproule-Manson, M.D. 123
An Address—Hon. Dr. H. A. Bruce 178
Anemia, Pathogenesis and Treatment of—William Magner, M.D. 5
Anterior Pituitary-like Extract—A. Marion Hilliard, M.D. 120
An Unscheduled Course—E. S. Ryerson, M.D. 16

Carcinoma of the Colon—E. M. Limbert, '34 103
Carcinoma of the Rectum—A. B. Noble, '34 107
Cerebral Blood Vessels, The Nerve Supply of, and Its Relation to Epilepsy—
Eric A. Linell, M.D. 64
Chronic Ulcerative Colitis—E. J. Malby, M.B. 83
Constitution of the University of Toronto Medical Society 31
Coronary Circulation, The—Jessie A. McGeachy, '37 139
Coronary Thrombosis—R. W. Graham, M.D.:
Part I. 91
Part II. 160
Cough, The Symptom of—Trevor Owen, M.B. 194

Empyema of the Pleura—M. Vera Peters, '34 95

Feeding Problems of Infancy, A Few of the Common—Wm. A. Hawk, M.D. . . . 218
Fractures of the Upper End of The Femur, Diagnosis and Treatment of—
L. A. Stubensey, '34 212

Heat Regulation—R. E. Haist, B.A., '36 18
Haemorrhage During the Early Months of Pregnancy—G. L. Watt, M.D. 233
Historical Development of the X-Ray—Dorothy E. Redmond, '39 175

Lymphatic Leukemia—J. B. Aiken, M.D. 67

Nephritis, The Treatment of—H. S. Hutchison, M.B. 53
Nose, Throat and Ear, The Medical Treatment of Diseases of—Perry G. Goldsmith, M.D.:
Part I. 153
Part II. 189
Numbness, Tingling and Dizziness—R. G. Armour, M.B. 168

Obituaries:
B. A. Bensley, B.A., Ph.D. 117
I. H. Cameron, M.B. 87
F. A. Cleland, M.B. 81
J. C. H. Copp 82
W. H. Dickson, M.B. 46
W. J. Hendry, B.A., M.D. 152
H. S. Hutchison, M.B. 118
T. V. O'B Wilson, M.D. 87

Pre-Eclamptic State, The—Helen I. McKinley, M.D.:
Part I. 11
Part II. 59
Pulmonary Tuberculosis, Surgery in the Treatment of—R. M. Janes, M.D. 230

Radio-Activity, Its Historical Development—V. J. Winston, '34 73
Respiratory Disease in Children—Gladys L. Boyd, M.D. 134
Rheumatic Fever—L. M. Pearlman, '34 25
Rheumatic Heart Disease—F. J. Hosking, '34 47
Ringworm—H. G. Pritzker, '34 244

Spinal Anaesthesia—Ellen Blatchford, M.D. 127
State Medicine in Western Canada—W. G. Bigelow, '38 248
Subacute Combined Degeneration of the Spinal Cord—Jessie C. Gray, B.A., '34. 144

Traumatic Neuroses—F. H. Cote, B.A., Ph.B., L., '35 207
Toronto and the Campaign Against Cancer—Percy Ghent 242
Tuberculosis in Ontario, Some Aspects of the Problem of—A. H. Sellers, M.D., D.P.H. 238
Tuberculous Joints, The Surgical Treatment of—B. J. Woods, B.Sc., '35 202

Varicose Veins of the Lower Extremity—F. O. R. Garner, '34 197
Visual Purple—Jean F. Davey, B.A., '36 142
Vitamins and Hormones, Recent Progress in the Biochemistry of the—G. F. Marrian, D.Sc. 171
Volkmann's Ischaemic Contracture—J. P. Bonner, '34 88

Women in Medicine—Harriott I. Gates, '34 130
Women Physicians, The—Edna M. Guest, M.D. 177
Women's College Hospital, The—Harriet Meiklejohn, R.N. 118